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EXAMINER	
SMITH, CHENECA	
ART UNIT	**PAPER NUMBER**
2192	
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09/10/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/827,523	K N ET AL.	
	Examiner	Art Unit	
	Cheneca P. Smith	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28 and 30-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28 and 30-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remarks

1. Applicants' amendment and response dated June 25, 2007, responding to the March 26, 2007 office action provided in the rejection of claims 1-35, wherein claims 1, 13, 15, 25-28, and 30-33 have been amended and claims 29, 34 and 35 have been cancelled. Thus, claims 1-28, and 30-33 remain pending in this application and have been fully considered by the examiner.

Applicant's arguments with respect to claims 1-28 and 30-33 have been considered but are moot in view of the new ground(s) of rejection – see Bharadwaj (US Patent 5, 894, 576), art made of record for the directed acyclic graph (DAG) and dependency analysis.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will

the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims **1-5, 7-8, 10-17,19-20, 22-28, and 30-33** are rejected under 35 U.S.C. 103(a) as being unpatentable over Scalzi et al. (US Patent 6,075,937) in view of Bharadwaj (US Patent 5,894,576) – art made of record.

As to claim 1, Scalzi teaches a method of translating binary code instructions from a source format to a target format for processing by a target processor, said method comprising the steps of:

identifying a source instruction (see column 6, lines 9-10),

selecting a translation template corresponding to said identified source instruction, said template providing a set of target instructions semantically equivalent to said identified source instruction (see column 6, lines 10-11 and column 12, lines 18-21),

translating said identified instruction in accordance with said template (see column 6, lines 11-14), and

outputting said translated instruction for processing by said target processor (see column 6, lines 14-17). Scalzi does not specifically teach

performing dependency analysis using a directed acyclic graph and generating dependency analysis code using input and output resources named in the template. In an analogous art, however, Bharadwaj is cited to teach performing dependency analysis using a directed acyclic graph (see column 6, lines 57-63) and generating dependency analysis code using input and output resources named in the template (see FIG.4 and associated text, i.e. column 3 lines 64-67 and column 4 lines 1-15). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Scalzi and Bharadwaj to increase the overall efficiency of the generated target code, as disclosed by Bharadwaj (see column 2, lines 35-38).

As to claim 2, Scalzi teaches a method according to claim 1 in which said source and target instructions include a control part and a data part and said control part being used in said identification step to identify an instruction (see column 22, lines 50-52).

As to claim 3, Scalzi teaches a method according to claim 2 in further comprising a transformation step in which said data part from said source instruction is transformed into said corresponding data part or parts of said set of target format instructions (see column 3, lines 2-7).

As to claim 4, Scalzi teaches a method according to claim 3 in which said transformation step is carried out in accordance with a bit filling routine associated with said template (see column 18, lines 14-18 and column 19, lines 46-49 and 57-60).

As to claim 5, Scalzi teaches a method according to claim 4 in which said bit filling routine is uniquely associated with said template (see column 18, lines 14-18 and column 19, lines 46-49 and 57-60).

As to claim 7, Scalzi teaches a method according to claim 2 in which said source instruction control parts are each concatenated to provide a unique identifier and said templates are indexed in accordance with said identifiers (see column 14, lines 31-40).

As to claim 8, Scalzi teaches a method according to claim 7 in which said templates are indexed by said unique identifiers in a look up table (see column 12, lines 56-59).

As to claim 10, Scalzi teaches a method according to claim 1 in which said templates are provided by software procedure calls (see column 10, lines 14-17).

As to claims 11, Scalzi in view of Bharadwaj teaches the limitations of claim 1, but does not specifically teach that the source format is 32 bit and the target format is 64 bit. However, Scalzi discloses that the source format of his invention is S/390 and the target format is PowerPC. It is well known in the art that S/390 has a 32-bit architecture and the PowerPC has a 64-bit architecture. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made that the source format is 32-bit and the target format is 64-bit in Scazi's invention, as his method can operate between any platform or processor type.

As to claim 12, Scalzi in view of Bharadwaj teaches the limitations of claim 1, but does not specifically teach that the source format is PA-RISC and the

target format is Itanium™ code. Instead, he teaches the source format to be S/390 code and the target format to be PowerPC code. However, it is well known in the art that PA-RISC is a 32-bit architecture and Itanium is a 64-bit architecture, which share the same characteristics as the source and target formats disclosed by Scalzi. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the source and target formats of Scalzi's invention with any other code formats, as Scalzi's method can operate between any platform or processor type.

As to claim 13, Scalzi teaches an apparatus for translating binary code instructions from a source format to a target format for processing by a target processor, the apparatus comprising:

an instruction identifier for identifying a source instruction (see column 6, lines 9-10),

a template selector for selecting a translation template corresponding to said identified source instruction, said translation template comprising a set of target instructions semantically equivalent to said identified source instruction and further comprising input and output resources (see column 6, lines 10-11 and column 12, lines 18-21),

a translator for translating said identified instruction in accordance with said template (see column 6, lines 11-14), and

an output buffer for outputting said translated instruction for processing by said target processor (see column 6, lines 14-17). Scalzi does not specifically teach a scheduler that performs dependency analysis using a directed acyclic

graph to represent dependencies and an analysis routine generator that generates dependency analysis code using the input and output resources named in the template. In an analogous art, however, Bharadwaj is cited to teach a scheduler that performs dependency analysis using a directed acyclic graph to represent dependencies (see FIG. 5, 54 and associated text i.e. column 4, lines 61-65 and column 6 lines 57-63) and an analysis routine generator that generates dependency analysis code using the input and output resources named in the template (see FIG.4 and associated text, i.e. column 3 lines 64-67 and column 4 lines 1-15). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Scalzi and Bharadwaj to increase the overall efficiency of the generated target code, as disclosed by Bharadwaj (see column 2, lines 35-38).

As to claim 14, Scalzi teaches an apparatus according to claim 13 in which said source and target instructions include a control part and a data part and said instruction identifier uses said control part to identify instruction (see column 22, lines 50-52).

As to claim 15, Scalzi teaches an apparatus according to claim 14 in which in said translator is operable to transform said data part from said source instruction into said corresponding data part or parts of said set of target instructions (see column 3, lines 2-7).

As to claim 16, Scalzi teaches an apparatus according to claim 15 in which said transformation is carried out in accordance with a bit filling routine

associated with said template (see column 18, lines 14-18 and column 19, lines 46-49 and 57-60).

As to claim 17, Scalzi teaches an apparatus according to claim 16 in which said bit filling routine is uniquely associated with said template (see column 18, lines 14-18 and column 19, lines 46-49 and 57-60).

As to claim 19, Scalzi teaches an apparatus according to claim 14 in which said source instruction control parts are concatenated to provide a unique identifier and said templates are indexed in accordance with said identifiers (see column 14, lines 31-40).

As to claim 20, Scalzi teaches an apparatus according to claim 19 in which said templates are indexed by said unique identifiers in a look up table (see column 12, lines 56-59).

As to claim 22, Scalzi teaches an apparatus according to claim 13 in which said templates are provided by software procedure calls (see column 10, lines 14-17).

As to claims 23, Scalzi in view of Bharadwaj teaches the limitations of claim 13, but does not specifically teach that the source format is 32 bit and the target format is 64 bit. However, Scalzi discloses that the source format of his invention is S/390 and the target format is PowerPC. It is well known in the art that S/390 has a 32-bit architecture and the PowerPC has a 64-bit architecture. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made that the source format is 32-bit and the target

format is 64-bit in Scalzi's invention, as his method can operate between any platform or processor type.

As to claim 24, Scalzi in view of Bharadwaj teaches the limitations of claim 13, but does not specifically teach that the source format is PA-RISC and the target format is Itanium™ code. Instead, he teaches the source format to be S/390 code and the target format to be PowerPC code. However, it is well known in the art that PA-RISC is a 32-bit architecture and Itanium is a 64-bit architecture, which share the same characteristics as the source and target formats disclosed by Scalzi. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the source and target formats of Scalzi's invention with any other code formats, as Scalzi's method can operate between any platform or processor type.

As to claim 25, Scalzi teaches a computer program product for translating binary code instructions from a source format to a target format for processing by a target processor, comprising a computer readable medium, further comprising:

a template for use in a binary code translator for translating binary code instructions from a source format to a target format for processing by a target processor (see column 6, lines 10-11 and column 12, lines 18-21), the template comprising:

a template identifier for uniquely associating said template to a source instruction (see column 12, lines 56-59), and

a set of target instructions in a target format semantically equivalent to the source instruction (see column 2, lines 15-20). Scalzi does not specifically teach

a set of codes for performing dependency analysis using a directed acyclic graph and a set of codes for generating dependency analysis code using input and output resources named in the template. In an analogous art, however, Bharadwaj is cited to teach a set of codes for performing dependency analysis using a directed acyclic graph (see FIG. 5, 54 and associated text i.e. column 4, lines 61-65 and column 6 lines 57-63) and a set of codes for generating dependency analysis code using input and output resources named in the template (see FIG.4 and associated text, i.e. column 3 lines 64-67 and column 4 lines 1-15). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Scalzi and Bharadwaj to increase the overall efficiency of the generated target code, as disclosed by Bharadwaj (see column 2, lines 35-38).

As to claim 26, Scalzi teaches a computer program product according to claim 25 further comprising a set of codes causing a computer to derive template identifier from a control part of the source instruction (see column 22, lines 50-52, and lines 57-61).

As to claim 27, Scalzi teaches A computer product according to claim 26 wherein the template causes a computer to transform a data part of the source instruction into at least one corresponding data part of the set of target instructions (see column 3, lines 2-7).

As to claim 28, Scalzi teaches a computer product according to claim 27 further comprising a set of codes for causing a computer to bit fill the data part of the source instruction.

As to claim 30, Scalzi teaches a computer product according to claim 26 wherein the template causes a computer to create the template identifier by concatenating the control part of said source instruction (see column 14, lines 31-40).

As to claim 31, Scalzi in view of Bharadwaj teaches the limitations of claim 25, but does not specifically teach that the template causes a computer to transform a source instruction having a 32 bit format to a target instruction having a 64 bit format. However, Scalzi discloses that the source format of his invention is S/390 and the target format is PowerPC. It is well known in the art that S/390 has a 32-bit architecture and the PowerPC has a 64-bit architecture. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made that the source format is 32-bit and the target format is 64-bit in Scalzi's invention, as his method can operate between any platform or processor type.

As to claim 32, Scalzi in view of Bharadwaj teaches the limitations of claim 25 but does not specifically teach that the template causes a computer to transform PA-RISC source code into Itanium TM target code. Instead, Scalzi teaches the source format to be S/390 code and the target format to be PowerPC code. However, it is well known in the art that PA-RISC is a 32-bit architecture and Itanium is a 64-bit architecture, which share the same characteristics as the source and target formats disclosed by Scalzi. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made

to replace the source and target formats of Scalzi's invention with any other code formats, as Scalzi's method can operate between any platform or processor type.

As to claim 33, Scalzi teaches a computer program product for translating binary code instructions from a source format to a target format for processing by a target processor comprising a computer readable medium comprising:

a first set of codes for causing a computer to identify a source instruction (see column 6, lines 9-10),

a second set of codes for causing a computer to select a translation template corresponding to said identified source instruction said template providing a set of target format instructions semantically equivalent to said identified source instruction (see column 6, lines 10-11 and column 12, lines 18-21),

a third set of codes for causing a computer to translate said identified instruction in accordance with said template (see column 6, lines 11-14), and

a sixth set of codes for causing a computer to output said translated instructions (see column 6, lines 14-17). Scalzi does not specifically teach a fourth set of codes for performing dependency analysis using a directed acyclic graph and a fifth set of codes for generating dependency analysis code using input and output resources named in the template for processing by said target processor. In an analogous art, however, Bharadwaj is cited to teach a fourth set of codes for performing dependency analysis using a directed acyclic graph (see FIG. 5, 54 and associated text i.e. column 4, lines 61-65 and column 6 lines 57-63) and a fifth set of codes for generating dependency analysis code using input

and output resources named in the template for processing by said target processor (see FIG.4 and associated text, i.e. column 3 lines 64-67 and column 4 lines 1-15). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Scalzi and Bharadwaj to increase the overall efficiency of the generated target code, as disclosed by Bharadwaj (see column 2, lines 35-38).

4. Claims **6 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Scalzi et al. (US Patent 6,075,937) in view of Bharadwaj (US Patent 5,894,576) as applied to claims 3 and 15 above, and further in view of Lee (US Patent 5,828,884).

As to claim 6, Scalzi in view of Bharadwaj teaches the limitations of claim 3, but does not specifically teach the transformation of data of one type of endianness to data of another type of endianness. Lee is cited to teach a method for converting data between different endian formats similar to Scalzi's. Lee teaches a method for compiling a software program and executing the program on a system that converts data between little endian and big endian formats (see Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Scalzi in view of Bharadwaj with those of Lee because Lee provides a method that allows software developers to develop more efficient, portable, and bug-free code with respect to byte ordering issues.

As to claim 18, Scalzi in view of Bharadwaj teaches the limitations of claim

15, but does not specifically teach the transformation of data of one type of endianness to data of another type of endianness. Lee is cited to teach a method for converting data between different endian formats similar to Scalzi's. Lee teaches a method for compiling a software program and executing the program on a system that converts data between little endian and big endian formats (see Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Scalzi in view of Bharadwaj with those of Lee because Lee provides a method that allows software developers to develop more efficient, portable, and bug-free code with respect to byte ordering issues.

5. Claims **9 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Scalzi et al. (US Patent 6,075,937) in view of Bharadwaj (US Patent 5,894,576) as applied to claim1 and 13 above, and further in view of Hughes et al. (US Patent 6, 519, 768 B1).

As to claim 9, Scalzi in view of Bharadwaj teaches the limitations of claim 1, but does not specifically state that the translation is carried out at runtime of an emulated application program. Hughes, however, is cited to teach an instruction translation method that is similar to Scalzi's. Hughes teaches a translation process that is performed at run time (see column 3, lines 66-67). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Scalzi in view of Bharadwaj with those of Hughes because Hughes provides an improved translation technique

that reduces many errors associated with the translation of instructions. In addition, Hughes also provides a new technique for improving the efficiency of block oriented code translation.

As to claim 21, Scalzi in view of Bharadwaj teaches the limitations of claim 13, but does not specifically state that the translation is carried out at runtime of an emulated application program. Hughes, however, is cited to teach an instruction translation method that is similar to Scalzi's. Hughes teaches a translation process that is performed at run time (see column 3, lines 66-67). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Scalzi in view of Bharadwaj with those of Hughes because Hughes provides an improved translation technique that reduces many errors associated with the translation of instructions. In addition, Hughes also provides a new technique for improving the efficiency of block oriented code translation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cheneca P. Smith whose telephone number is (571) 270-1651. The examiner can normally be reached on Monday-Friday 7:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CS
8/31/2007

TUAN DAM
SUPERVISORY PATENT EXAMINER